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Customer Complaint Management Systems (CCMS) in a food processing industry

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Customer Complaint Management Systems (CCMS) in a Food Processing Industry

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Abstract

The food processing industry must meet customers' highest quality expectations at the lowest cost. I partnered with Nestlé's pizza facility in Little Chute, WI, to improve the current customer complaint approach of the quality department, which aimed to improve product quality. To improve the total quality of the system, this project established a defensive method of addressing customer complaints. Some strategies used to improve the current Customer Complaint Management System (CCMS) include Quality Functional Deployment (QFD), fuzzy logic, Kano's methods, Voice of the customer (VOC) and Go-See-Think-Do (GSTD). These strategies are all related, but have not previously been used collaboratively. The joined force of these methods will better satisfy the customer, improve quality, and decrease overall error. During the Summer of 2014, a work-study was conducted on the DiGiorno pizza line to identify the areas in need of change. The application of multiple quality strategies was researched throughout the fall of 2014. These strategies were then blended to best suit the DiGiorno pizza line. The result was a customer complaint management system that provided a methodical approach to addressing customers' complaints and correcting the associated manufacturing component. The new system will be incorporated into the Nestlé plant in the future.

List of Figures, Tables, and Appendixes

Objective

The objective of the project is to create a standard process for collecting, managing, and correcting customer complaints by using a combination of available quality improvement strategies. A systematic approach for how to combine these strategies has never been explored. The research will provide guidelines on the type of customer-oriented strategies, which should be used, and lead to a standardized process. The standardized process should reduce the number of customer complaints which should reflect on the total quality of the product. The newly proposed standardized procedure will be compared with the present system which is currently used at Nestlé's Little Chute, WI plant.

Literature Review

A variety of strategies used in this study have been carved in detail by several experts in the field of a Customer Complaint Management System (CCMS). The main strategy used in this study is Quality Functional Deployment (QFD), which helps determine the needs and wants of the customer in relation to design requirements. This process defines the product to be refined and process cycle time to be decreased[1]. The QFD has four phases: planning, assembly/part development, process planning, and process quality control. This four-phase process results in the development of the House of Quality diagram, which is a chart that inter-relate the design specifications, customer needs, engineering characteristics, target specifications, and competitor's benchmarks, as seen in Appendix A (a)[2].

The customers' needs and their importance values are derived from data collect in a Kano questionnaire. This type of questionnaire surveys customers' opinions of product capabilities

with a ranking system of customers need to have or not have said requirement. The ranking system is constant for all questions, 1. I like it that way, 2. It is a basic necessity or I expect it that way, 3. I am neutral, 4. I dislike it but can except it, 5. I dislike it that way. The different answers from the parallel questions, about the absence or presence of a feature, help determine which features are most important to the customer[3]. The information in the chart changes as the product is produced in the four phase approach. Transitioning the comparison from customer needs and engineering characteristics to key process operations and production requirements (Appendix A (a)) [2].

The efficiency of the QFD system does not come without flaws. The system can be vague and complex. The QFD system also requires the conversion of needs into the language of the company, which can result in vagueness. The result of this vagueness is called fuzzy logic. Fuzzy logic is the quantitative values applied to the Voices of the Customer. These values, regardless of their flaws, allow for the tradeoff between customer wants and the company budget[2]. As with all systems, QFD has limitations and problems with implementation. Companies often struggle with the implementation of QFD because of its cross-functionality, resulting in issues such as lack of time, short-term thinking, and fixation on tradition[4]. Many US companies are organized by functional groups, but the House of Quality requires communication between these groups to focus on the product improvement. This improvement focus should be led by the management team[5].

QFD systems can be successfully implemented into the service sector. González-Bosch & Tamayo-Enríquez implemented QFD, as a way of reducing customer complaints, in an airline

company referred to as "LatinAir". The results of the case study showed that not only were there fewer customer complaints, but also increase employee morale. However, without a committed management team the results were thought implausible[6]. This need for a strong management team can be seen throughout phases and case studies. The strategy of maintaining a culture of continuous improvement led by management level is called *Kaizen*[5].

The motive for companies to use a strategy like QFDs is to strive for quality through customer-focused development[7]. Quality is a characteristic that must be infused in the product in order to meet the needs of the customer. Quality goes hand-in-hand with value. The value the company has in their product will transfer to the value the customer feels towards the company that produced the product. The value/quality drives markets and allows QFD systems to work. In this design, QFD systems are not a final destination, rather they are the paths that lead there[8].

QFD and problem solving methodologies incorporated by CCMS in order to correct the problem causing the complaint. CCMS success can be determined based on three criteria: (1) time to respond to customer complaint, (2) percentage of closed cases, and (3) evaluation of service level. This grades the system based on its ability to compensate the customer and fix the problem of the complaint so that it does not happen again. Unfortunately, there are also three items that hinder CCMS proliferation, including immediate visible costs, managerial doubt of customer honesty, and projection of blame to venders. The CCMS must also compensate for the nearly 80% of unsatisfied customers that choose not to file a complaint[6]. In order for the customers who do provide feedback, to see any change as a result and continue to buy the product, each complaint must be taken seriously. Six important factors to remember when

responding to the customer, post-complaint are timeliness, facilitation, readiness, apology, credibility, and attentiveness. The active implementation of these characteristics affect the "word of mouth likelihood", "word of mouth prevalence" and the "intention of repurchase" [9]. These characteristic determine the cost of each individual complaint, since one dissatisfied customer can deter many future or current customers. Customer complaints collected online are good supporting sources when simply, easily used, and taken seriously[9]. The collection of complaints via online resources allows for more useful knowledge to be given back to the company and a more timely response to the customer[10].

Introduction

Humans have transformed food for millions of years. Food processing includes preservation, fermenting, and washing of foods. The more common types of industrial food processing include washed and pre-cut foods, canned and pre-packaged foods, and ready-to-eat foods, such as frozen meals and cereal[11]. In developed countries, food-processing industries take raw foods from farmers and create a product that is more user friendly than the raw food alone.

In the United States, food processing is one of the largest manufacturing sectors[12]. Food processing is defined by the International Standard Industrial Classification by code 31 in which food, beverages, and tobacco are processed and manufactured[13]. To mass-produce processed foods, the industry must integrate strategies that have been employed in other manufacturing fields. The concept of mass-producing was introduced to the manufacturing field at the turn of the nineteenth century with the industrial revolution. There have been continuous advances in the food processing operations, which ultimately led to an increase in life expectancy. This

increased life expectancy resulted from the ability to produce more food from improved farming techniques and processing of food using manufacturing technology[14].

The ability to improve the quality of a manufacturing process is the ability to reduce error. Within manufacturing, efficiency refers to the addition of more value in less time. The quality of the food processing industry is important because without proper quality measures customers would be at risk. The purpose behind all Quality Management Systems is to create a trusted relationship between the customer and the company. It is essential that companies satisfy customers because satisfaction is the best indicator of the company's future[13]. The operations not only need to have a low cycle time, but also a high quality. Machines have a lower error rate than laborers, but can only improve as much as technology allows. To reduce the number of errors without advancements in technology, quality management of the system must improve.

In order to improve the total quality of a food processing system, a defensive method of addressing customer complaints must be established. Some strategies to improve the current Customer Complaint Management System include Quality Functional Deployment, fuzzy logic, Kano's methods, Voice of the customer and Go-See-Think-Do. These strategies are all interrelated and work together to better satisfy the customer, improve quality, and decrease overall error.

Nestlé's pizza plant in Little Chute, WI is interested in improving its existing quality of the products. The company offered me a summer internship in 2014 to conduct a work-study on one of their production lines. I recorded and collected all relevant data during the summer to

improve customer satisfaction. The data and evaluation of results were analyzed in the fall 2014. Defining the solution and documentation of the proposed instructions were completed in the spring 2015.

Current Procedure

Starting in May of 2014, the current system for regulating customer complaints at Nestlé's Little Chute, WI plant was observed. I then became involved in the collection, organization, and problem teams associated with the complaints, to better understand the strengths and weaknesses. Research was then conducted on current strategies that were being used, such as Telerex's collection system and Go-See-Think-Do. A complete list of strengths and weaknesses was compiled by the August 1, 2014 (Table 1).

Table 1.Current strategies strengths and weaknesses

Current Strategies	Strengths	Weaknesses
Telerex Contracting	Does what is asked, consistent and on-time information	Not getting all the information Nestle needs from the customer
Microsoft Access	Table format built in	too many versions, cannot be linked to a website
Go-See-Think Do	determines root cause of a problem	not monitored or enforced procedure

Process

In the current procedure (Figure 1), a complaint is submitted through postage, email, or phone call. Nestlé contracts customer support to a company call Telerex that answers the 1-800 number and collect complaint information. The information collected includes the product name, complaint verbatim, and the manufacturing code. The manufacturing code is often not collected,

which causes a large amount of incomplete information from the customer since this codes states when, where, and who made the damaged pizza.

The submitted complaints are compiled in an excel sheet by Telerex employees and emailed to the quality manager weekly. This process is also very time consuming for the quality manager, taking multiple hours each week. The information collected must be transferred and further product data analyzed for the 500-800 complaints received per week by the quality manager, such as probable manufacturing line if the manufacturing was not given. Since this data is compiled on Microsoft Excel document, there are several versions of this file, increasing the disorganization of this process. The top 5 complaints are assigned to teams who conduct a Go-See-Think-Do, which is a problem analysis strategy. This strategy, which is used in all Nestlé USA facilities, has been shown to be effective whenever it is monitored. In the current process there is hardly any control measures in place to enforce the procedure.

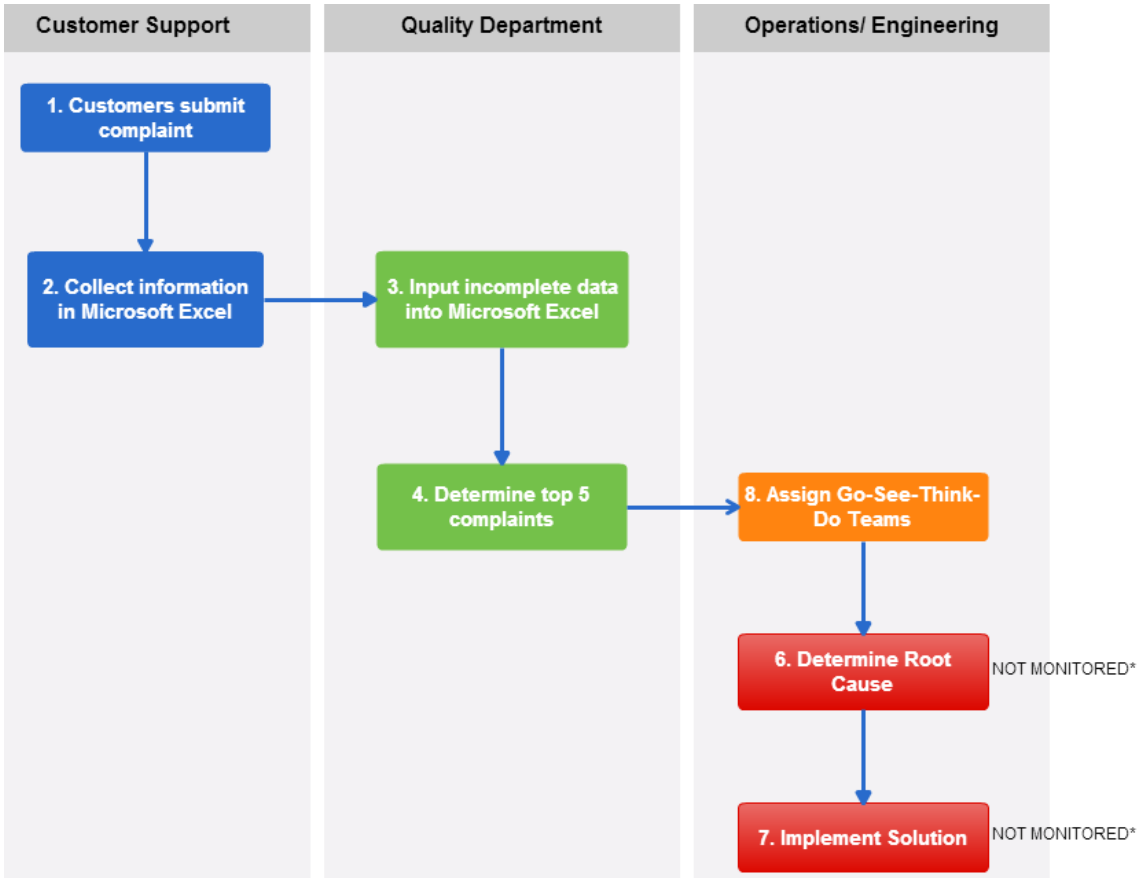

Figure 1. Flowchart of current CCMS

Proposed Procedure

During the fall of 2014 more research was done on strategies not currently in use at the Nestlé plant. A list of strength and weaknesses was then compiled for each new strategy (Table 2). The accumulation of strategies was then analyzed to determine their ability to work in collaboration with the other strategies. Based on the objective to improve the collection, management, and correction of customer complaints, the best strategies were placed in a category of collection, management, or correction. Once an order of the strategies was decided, starting with the input of the complaint, strategies were specifically applied the DiGiorno pizza line.

Table 2. Proposed strategies strengths and weaknesses

New Strategies	Pros	Cons
Microsoft Access	Can be linked to a database, easily updated, table format and analysis built in	Have to train employees
Kano Questionnaire	Can see the importance of a component to a customer from the view of its presence and absence, easy to fill out	will people answer the survey?
Fuzzy Logic	Allows for quantifying customer verbatim	how are the values determined?
Quality Functional Deployment	provides documentation of procedure and findings, sets relationship between process and product components, provides information for new product design	difficult to fill out, software can be expensive for a large corporation

Proposed Process

The proposed process will combat the disadvantages of the current procedure, Figure 2. When customers are unsatisfied with the product, they can either call "Telerex", a contracted company that collects information for Nestlé, or manually fill out a web form (Appendix B.), that can be found on the product website, to report this complaint. The data is then compiled in Microsoft Access by Telerex or the web form (Table 1). An apology note and a Kano questionnaire, see Appendix C, are sent automatically back to the customer via email.

Table 3. Data Collected from Customers by Contracted Company (Telerex)

Information Collected from Customer	Description
Product	Product Name (Includes brand, toppings, if half & half, specialties, size, etc.) Ex. DIG Pepperoni 12"
Complaint/ Comment/ Inquiry	Type of customer response
Complaint level 1	What part of the pizza the complaint refers to Ex. Crust or Ingredients
Complaint level 2	Type of the complaint (gives the rank)
Complaint level 3	Strength of the complaint (gives points)
MFG Code	Manufacturing code from the box (contains plant ID, case ID, best used by, manufacturing, day, manufacturing line, manufacturing shift, manufacturing time)
Plant Code	Comes from MFG code
Case Id	Comes from MFG code
Best Used By	Comes from MFG code
Manufacture Julian Day	Comes from MFG code
Manufacturing Week	Comes from MFG code
Manufacture Site	Comes from MFG code
Manufacture Line	Comes from MFG code
Manufacture Shift	Comes from MFG code
Manufacture Time	Comes from MFG code
Date Received	Date complaint received
Week of the year	Week of the year complaint received
Re-stage	If the product is new (within 6 months of introduction to market)
Reform	If the product has been changed
Unknown	Is part of the product Name or MFG code missing
Critical	Complaint that has a rank of 6 or above

The data from the questionnaire is compiled and analyzed by the Quality Assurance Manager on a monthly basis. This data can then be used to determine the type of complaint, "Complaint Level 2", and strength of complaint, "Complaint Level 3" (Table 1.) Telerex and the web form use the fuzzy logic form (Appendix D), to calculate weights of complaints. The fuzzy logic rank values can change based on the results of the Kano questionnaire. The ranks seen in Appendix D range from 1-10. A complaint with rank of above 5 is considered critical and immediate

investigate is almost always required. These values are based on how likely the customer is to repurchase the product and the top complaints from the DiGiorno Pizza line in summer 2014.

Example of how to calculate weight of complaint based on fuzzy logic:

Rank x type of complaint = points

*Note: fewer the points the better the product

Product	Complaint
DIG 4 Cheese Pizza	Inner wrapper was not sealed at all, pizza didn't rise

Unsealed inner wrapper: 3 x 3= 9
Pizza did not rise: 2 x 2=4
+_____
13

Points for this complaint = 13
Points from packaging = 9
Points from crust = 4

The value of the complaints totaled and categorized type (category that is given a rank). The top one-third complaint types with the highest points per product are assigned an investigation team. The teams will not be disbanded until the complaint type is no longer in the top two-thirds complaints. The teams perform the following procedure of Go-See-Think-Do to ensure the correction of the problem, see Appendix E. This procedure should be applied per division. The divisions include DiGiorno, Jack's, and Pizzeria.

This procedure involves many brainstorming techniques that will work to determine the root cause. Quality Functional Deployment will be used as a final documentation step of by recording all complaint types as customer needs and showing their relationship to the

manufacturing process. If the product is deemed unsuccessful, product components can be redesigned using QFD's House of Quality.

The customers are contacted again via email once the root cause has been identified to reinsure them that the complaint has been fixed, and will not happen again. This action will help to improve the number of returning customers who have complained.

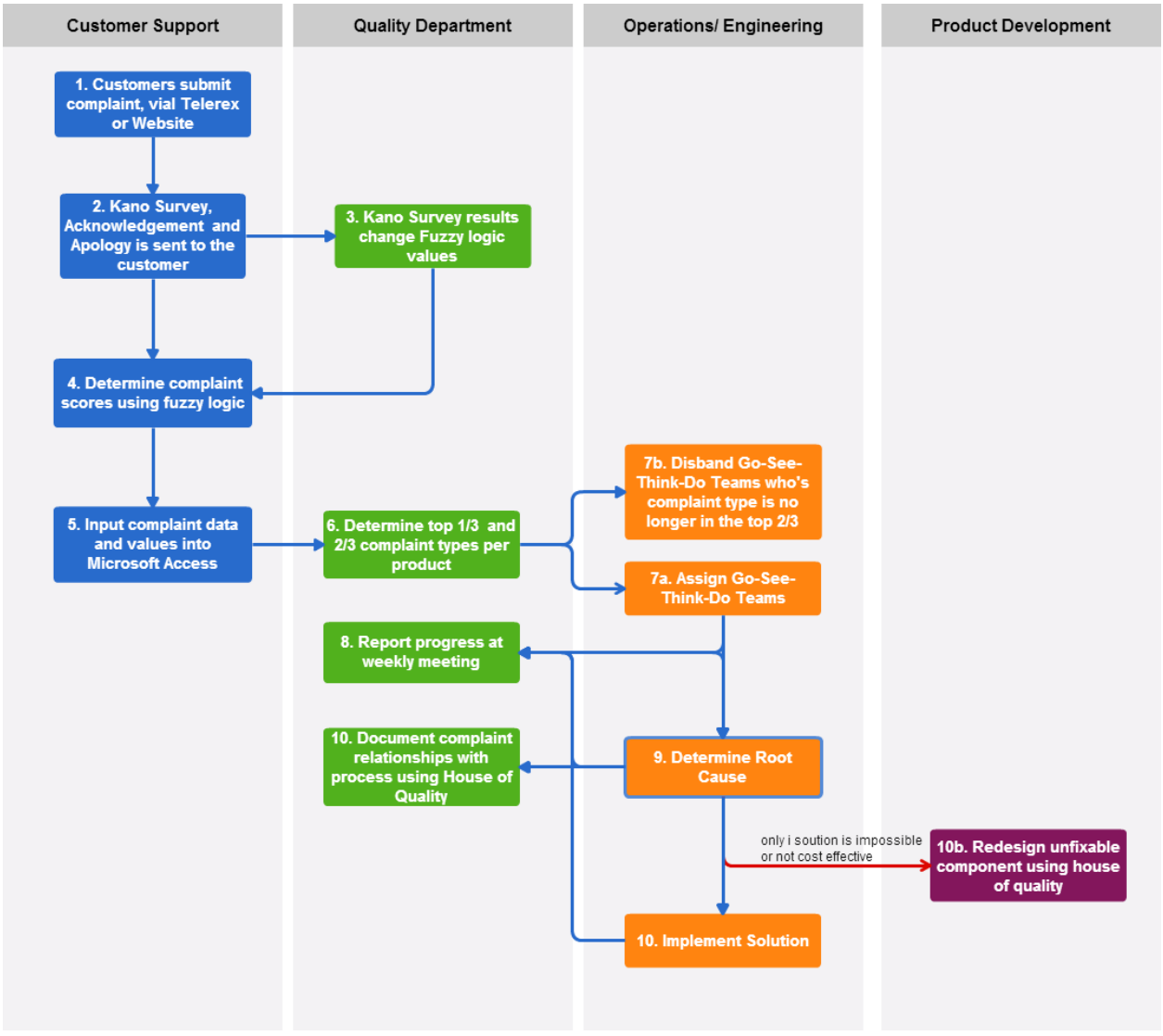

Figure 2. Flowchart of proposed CCMS instructions

Discussion

The information collected through web form or Telerex employees displayed in Table 1. is significant in the determination of the root cause of the problem, including production line, day, and time of problem occurrence. This information is stored in Microsoft Office Access. This tool is a database that can be easily updated by multiple people and even linked to website form to allow for simpler input of data. Microsoft Office Access allows for better organization and removing much of the clutter associated with multiple Microsoft Excel documents. Through this system, complaints will not be accepted via postage because of the inconsistency of product information.

The Voice of the Customer, or verbatim, is still a critical aspect of the collected data. The verbatim of the complaint is then analyzed based on fuzzy logic (Appendix D), predetermined and standardized according to the Kano questionnaire and historical top complaints. Fuzzy logic is used because it gives each complaint a quantifiable value that can be separated into complaint type. Quantifying complaints allows solution-focused teams to be more appropriately assigned to areas of the most product and problem type complaints. The fuzzy logic values will be used to prioritize complaints base on the rank multiplied by the strength. These values will be used when determining the top one-third complaint types. The Kano questionnaire uses paired questions to ask the importance of having a component and absence of the same component. This information is used to determine the customers' needs beyond their complaint. The results are used in the creation of the fuzzy logic table and the importance values of the House of Quality.

Teams use Go-See-Think-Do (Appendix E) strategies to guarantee the accuracy of the complaint. GSTD uses team based root-cause analysis to find a long-term solution to the complaint. This strategy is currently in place, but not being reinforced. By the use of the one-third and two-thirds rules, and regular scheduled meetings, these teams will be held accountable.

The QFD's House of Quality (Appendix A) will be used as documentation to track customer needs by incoming complaint types and compare them to the manufacturing process, also called design requirements. This comparison will also be used as document of the likely source of the complaint, since the relationship between the needs and processes is determined. This relationship will likely rely on GSTD to be defined. The House of Quality is also used to redesign products and product components, the customer complaints associated with the redesigned product revert to zero.

To ensure the proposed CCMS is functioning better than the previous management systems, customer complaint teams will be tracked and the length of time an investigation team is active should be less than before the system was implemented. The measure of time of initial GSTD team assignment till disbandment will the metric used to evaluate performance of the system. Knowledge of the new system's superior functioning is unknown until the new system is implemented. It is possible to implement this procedure with previously collected information, but it would be more efficient to begin using the system with new complaints since many of the steps involve the collection of information.

Due to financial and time constraints, the new system was not implemented and quantifiable results were not found. However, based on research, all of proposed strategies have demonstrated an improvement of most systems, therefore, the combination of them will almost certainly prove to reduce the number of customer complaints[13].

Conclusion

A standardized CCMS was created based on numerous quality improvement strategies. Some strategies include Quality Functional Deployment, fuzzy logic, Kano's methods, Voice of the customer, and Go-See-Think-Do. These strategies are all related, but have not previously been used collaboratively. The system is planned for the Nestlé's pizza facility in Little Chute, WI with the overall goal to improve total quality of their products reducing the number of customer complaints. The new system is yet to be implemented, but will likely be successful based on research.

Future Work

This project should be expanded by implementing the standardized CCMS into Nestlé's pizza facility in Little Chute, WI. A quantifiable analysis should then be completed to compare the number of complaints before the new system was implemented and nine months after the system was implemented. The proposed system is based on previous data collected in 2014. The nine-month wait time is needed due the three months it takes for the product to reach stores after its production date. This project can then be continued further by modifying the strategies to work for other production lines, such as Tombstone. Taking the system even further, the system could be applied to all types of manufacturing, such as car production.

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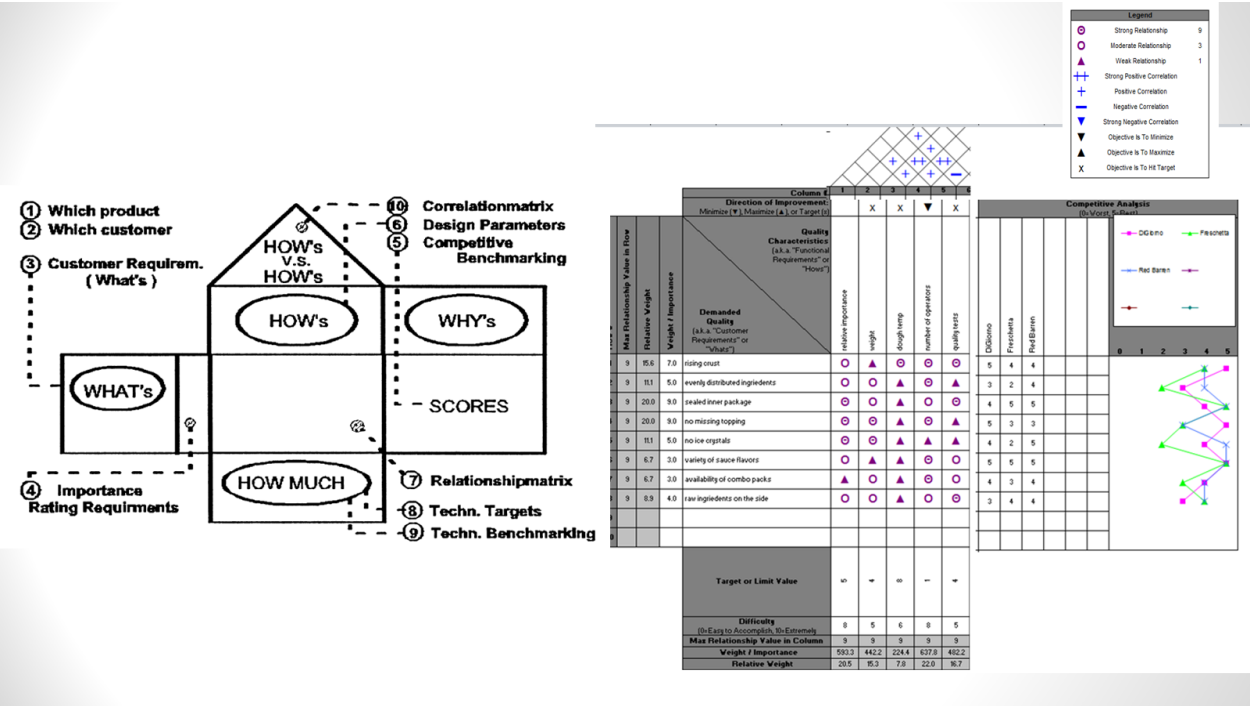
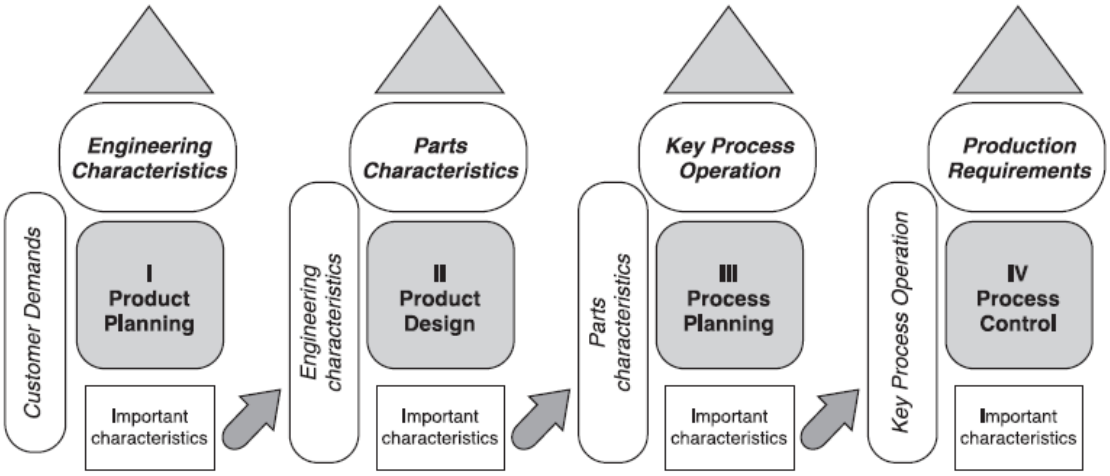
Appendix A

House of Quality Template (left) and DiGiorno example (right)(a) and the Four phase transitions of Quality Functional Deployment (b) [9]



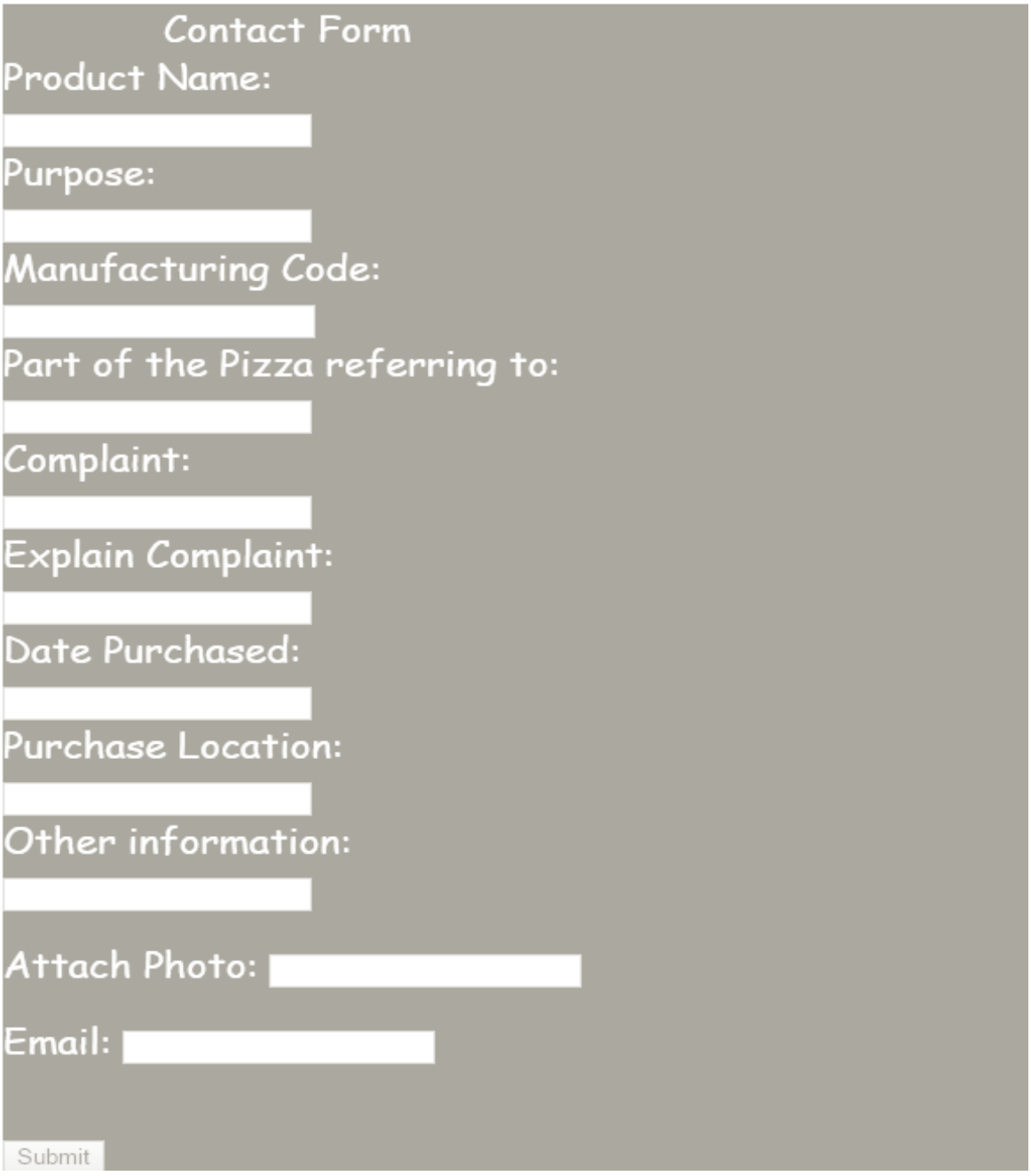
a)



b)

Appendix B

DiGiorno Pizza Complaint Web Form Template



Appendix C

DiGiorno Pizza (Kano) Questionnaire

If the crust rises during cook time, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the crust does not rise during cook time, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If there was sauce and ingredients on the crust, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If there was not sauce and ingredients on the crust, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the ingredients were evenly distributed on the pizza, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the ingredients were not evenly distributed on the pizza, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If a variety of sauce flavors were available, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way

If only one sauce flavor was available, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the inner packing came completely sealed, how would you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the inner packing came unsealed, how would you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the pizza came as a combo, such as with chicken wings and cookie dough, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the pizza did not come as a combo, such as with chicken wings and cookie dough, how do you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the pizza came with the raw ingredients on the side, how would you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If the pizza did not come with the raw ingredients on the side, how would you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If there were ice crystals were present on the	1. I like it that way

pizza, how would you feel?	2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
If there were not ice crystals were present on the pizza, how would you feel?	1. I like it that way 2. It is a basic necessity or I expect it that way 3. I am neutral 4. I dislike it but can except it 5. I dislike it that way
Rank the amount of toppings (1 being not enough and 5 too many).	1 2 3 4 5
Rank the taste of the sauce (1 being bland and 5 too strong).	1 2 3 4 5

Appendix D

Fuzzy Logic Complaint Weights

Rank					other tasks
Flavors					
1	salt	1- salty	2- too salty	3- way too (very) salty	
1	strong	1- strong	2- too strong	3- way too (very) strong	
1	sweet	1- sweet	2- too sweet	3- way too (very) sweet	
1	bland	1- bland	2- too bland	3- way too (very) bland	
Ingredients					
3	missing	1- a topping was missing	2- some toppings were missing	3- all toppings were missing including cheese	Please list toppings missing
2	unevenly distributed	1- toppings were overlapped or off centered	2- toppings were very overlapping or off centered, or on crust	3- toppings were only on half or less of the pizza	Please list toppings unevenly distributed
1	lacking ingredients	1- not enough of one ingredients (including sauce)	2- very little of multiple ingredients (including sauce)	3- only one pepperoni/sausage etc. extreme	Please list ingredients lacking
Crust					
3	broken/cracked	1- crust was craked	2- crust was broken	3- crust was broken and uncookable	
1	stale	1-crust was stale	2- crust tasted very stale	3- crust was stale and unedible	
2	didn't rise	1-crust only rose a little	2- crust didn't rise	3- crust didn't rise and was unediable	
1	didn't cook right	1- browned in time designated by packaging	2- burnt (black) in time designated by packaging	NA	

Packaging					
3	unsealed inner packaging	1- damage to inner package	2- inner package seal was loose	3- inner package's seal was completely broke	
2	freezer burn/ ice crystals	1- some ice crystals on the top	2- covered in ice crystals	3- covered completely with ice crystals unedible	date purchased
6	mislabeled (ingredent present not mentioned)	investigate/ RECALL	investigate/ RECALL	investigate/RECALL	
1	handling packaging	1- packaging was difficult to open	2- crust was stuck to packaging	3- crust was unable to be removed from packaging	
Foreign Materials					
10	Hair	count instances to determine if new protective wear should be implemented			picture please
10	Metal	Investigate			picture please
10	Bug	Investigate			picture please
10	Mold	Investigate			picture please
10	chemical taste	Investigate			picture please
10	other	Investigate			please describe and send picture, and send to following address

Appendix E

Go-See-Think-Do Template

Effective Date: 5/29/2012	Owner: Goal Alignment Pillar Leader

GA 1022 - Go See Think Do, Springville, U

Everyday Problem Solving

Nestlé CONTINUOUS EXCELLENCE

GO-SEE

LEADER: **PARTICIPANTS:** **AREA/LINE:** **DATE:**

Circle the trigger: *Safety** *Quality* *Cost* *Performance* *TPM (i.e. SOC/HTR)* *(*If Safety, please submit a copy to Safety Mgr)*

Describe the Problem

Check Conditions, Standards and Procedures

Check Points	What is the Action?	Who	When	Status
*Write **Y** for Yes, **N** for No on the Tick Box*	*If "No" write down Action, Who, When, Status. If "yes" explain the reasoning.*			
[Y] Do we have corrective (temporary fix) and containment actions?				
[Y] Do we have a standard that is clear and available?				
[Y] Do people know the standard and are they trained?				
[Y] Do people follow the standard?				
[Y] Are equipment and materials in specification?				

Process Flow
Information Flow
Material Flow

Draw/Sketch the Flow/Machine/Process

How to fix problem when scale auto-fills in weights all at once:

Focus in on the Problem

What is the main Issue?		**When** does it occur?	
How Much/ How Many		**Where** is the issue? (physical location)	
Which pattern do you see?		**Who** is involved when issue occurs? (Name)	

Problem Statement *(W+W+W+W+W+H):*

Expected Result *(What is the criteria for Success):*

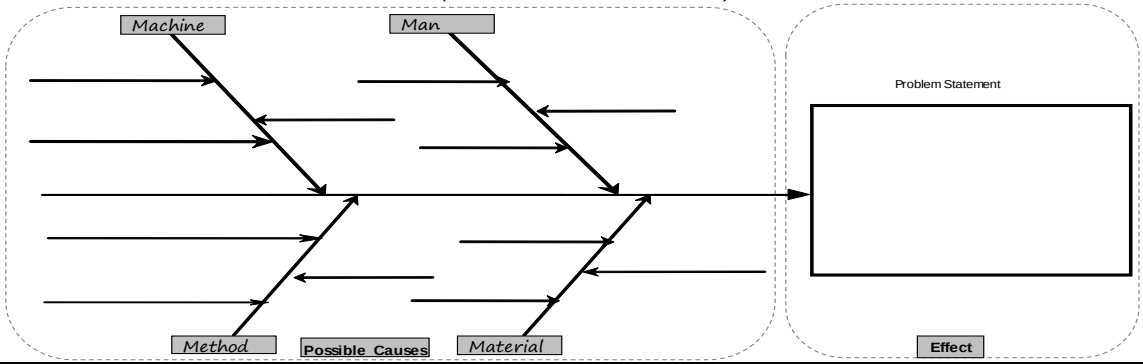
THINK

Brainstorming: Write potential causes here, then transfer the idea numbers to the Cause-Effect Analysis (Fishbone) below

1.	5.	9.
2.	6.	10.
3.	7.	11.
4.	8.	12.

Group Brainstorming Items Into Categories: HuMan / Machine / Method / Materials / EnvironMent / Measures

CAUSE-EFFECT ANALYSIS *(Circle the causes not ruled out at the GEMBA)*



Go See Think Do

Everyday Problem Solving

CONTINUOUS EXCELLENCE

THINK

5 WHY ANALYSIS (Go deeper to find the root cause)

MAIN POSSIBLE CAUSES	Yes/ No	WHY?	Yes/ No	WHY?	Yes/ No	WHY?	Yes/ No	WHY?	Yes/ No	WHY?

1. *Start the Question with **WHY**, Start the answer with **Because***
2. *Put* YES *- if cause is verified in the gemba,* NO *- if cause is not confirmed in the gemba*
3. *Circle verified root causes*
4. *Number each root cause with 1, 2, etc. to be used for Action List*

Plan and Implement Preventive and Sustainable Solutions

Root Cause #*	Action List	Who	When	Status

Write down the **NUMBER corresponding to the root cause as identified in the 5 whys (previous step)*

DO

Checking the Impact of your actions on the Indicator

Before	***After***

Standardise and Share Key Learnings

Check Points	YES/ NO/ N/A			If NO, What is the Action? If YES, explain your reasoning.	Who	When	Status
Has the standard been created and/or updated?	YES	NO					
Has OPL (One Point Lesson) been written on learning point(s)?	YES	NO	N/A				
Have we trained the new or updated standard?	YES	NO					
Have we communicated this to everyone involved?	YES	NO					
Have we identified how we will measure, monitor and manage the improvement?	YES	NO					
Can we apply to similar machines/process?	YES	NO	N/A				